Hepatitis C treatment for multimorbid patients with substance use disorder in a primary care-based integrated treatment centre: a retrospective analysis

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Abstract: OBJECTIVES/BACKGROUND: The population of people who use drugs (PWUD) has the highest prevalence of hepatitis C virus (HCV) infections in Europe. PWUD are multimorbid patients who are difficult to integrate into existing healthcare systems. In our study, we evaluated the feasibility of providing HCV treatment within opioid maintenance treatment (OMT) programmes offering integrated primary care-based health services under one roof. METHODS: We evaluated 66 charts of patients in four outpatient clinics (OMT) with HCV treatment (between 2002 and 2010). Fourteen of the patients were treated with heroin and nine patients had an HIV coinfection. Data on the socioeconomic characteristics and quality of life were assessed. We counted the number of consultations in the clinic to assess how much supportive care the patients needed. RESULTS: Overall, 62% of all patients (41 out of 66) achieved a sustained virological response (SVR). A total of 84% of patients with genotype 3 achieved an SVR. Sixty-four percent of patients treated with heroin achieved an SVR. The majority of patients (71%) used illicit drugs during HCV treatment and over 80% were diagnosed with psychiatric comorbidities. Comparisons of patient characteristics according to SVR or non-SVR showed that a longer duration of OMT, more consultations per week during HCV treatment and poor self-reported physical condition were associated with non-SVR. CONCLUSION: We conclude that offering HCV treatment in an integrated primary care-based setting with OMT and individualized use of different supporting strategies allows for treatment success rates in the population of PWUD that is comparable to the ones in the population of patients without drug use. Heroin maintenance treatment programmes offer a feasible and safe setting for providing HCV treatment.

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Running Head: Primary care based HCV treatment for PWUD

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ABSTRACT

The population of people who use drugs (PWUD) has the highest prevalence of hepatitis C virus (HCV) infections in Europe. PWUD are multimorbid patients that are difficult to integrate into existing healthcare systems. In our study, we evaluated feasibility of providing HCV treatment within opioid maintenance treatment (OMT) programs offering integrated primary care based health services under one roof.

We evaluated 66 charts of patients in four outpatient clinics (OMT) with HCV treatment (between 2002 and 2010). 14 of the patients were treated with heroin and 9 patients had a HIV co-infection. Data on socio-economic characteristics and quality of life were assessed. We counted the number of consultations in the clinic to assess how much supportive care the patients needed.

62% of all patients (41 of 66) achieved sustained virological response (SVR). 84% of patients with genotype 3 achieved SVR. 64% of patient treated with heroin achieved SVR. The majority of patients (71%) used illicit drugs during HCV treatment and over 80% were diagnosed with psychiatric co-morbidities. Comparisons of patient characteristics according to SVR or non-SVR showed a longer duration of OMT, more consultations per week during HCV treatment and poor self-reported physical condition were associated with non-SVR.

We conclude that offering HCV treatment in an integrated primary care based setting with OMT and individualised use of different supporting strategies allows for treatment success rates in the population of PWUD which is comparable to the ones in the population of patients without drug use. Heroin maintenance treatment programs offer a feasible and safe setting for providing HCV treatment.

KEY WORDS

chronic condition, co-morbidity, hepatitis C virus, heroin maintenance treatment, on-going illicit drug use, opioid maintenance treatment, people who use drugs, primary care

INTRODUCTION

Hepatitis C infections are widely spread in the population of former and current injecting drug users causing significant morbidity and mortality among them (1, 2). There are an estimated 170 million people around the world carrying the hepatitis C virus (HCV) (1, 3) and in the population of people who use drugs (PWUD) the estimated prevalence of HCV antibodies varies between 60-80% (4). In Switzerland PWUD show the highest prevalence of HCV infection (5).

PWUDs are patients with high rates of psychiatric and somatic co-morbidities and multiple substance abuse is common. PWUD are a group of multimorbid patients that is known to be hard to reach and particularly difficult to integrate into existing health care systems. Even though treatment for HCV infection exists with rates of sustained virological response (SVR) in more than 50% of patients, the population of PWUD is rarely treated (6). Studies have showed the feasibility of HCV treatment in this population *(7-10),* but eligibility remains low because patients with on-going illicit drug use, alcohol consumption, psychiatric co-morbidities or HIV infection are often excluded from treatment.

Because of their complex needs, opioid-dependent patients are often treated in specialised, multidisciplinary opioid maintenance treatment (OMT) programs. OMT programs usually focus on addiction and psychiatric conditions, while physical conditions are neglected. In OMT programs, patients might have on-site access to basic primary health care. For more specialised treatments, as HCV requires, they have to be referred to secondary or tertiary care specialists. In these off-site clinics, the complex medical and psychosocial conditions of PWUD and the anticipation of potential psychiatric side effects can act as a barrier to starting HCV treatment.

At the individual level, the main indication for hepatitis C treatment is to prevent end-stage liver disease and liver cancer. At public health level, scaling up treatment uptake in this heavily affected population could contribute to reducing the epidemic (11). One

way to achieve this could be to develop and provide appropriate integrated settings for this marginalised group of patients in order to enhance their eligibility for treatment uptake.

Arud runs four outpatient clinics for addiction medicine in Zurich, Switzerland, offering integrated primary care based interdisciplinary health services all under one roof. In this setting, patients are being treated for their addiction as well as their psychiatric co-morbidities. Opioid-dependent patients can be treated with methadone, buprenorphine, long-acting morphine and prescribed heroin, depending on their individual situation and needs. In each clinic, on-site primary medical care is available including infectious diseases specialist care for HCV and HIV assessment and treatment.

The objective of this study is to analyse the outcome of HCV treatments in the integrated primary care based outpatient clinics providing HCV care for a population that is difficult to treat, including patients with on-going use of illicit drugs and alcohol and with psychiatric co-morbidities. In addition, we aimed to investigate patient characteristics associated with HCV treatment outcome.

METHODS

Study design and patient population

We conducted a retrospective chart review of all patients in the primary care based outpatient clinics for addiction medicine with HCV treatment for the period from 2002 to 2010.

Psychiatrists and psychologists were responsible for the substance abuse counselling including opioid substitution with methadone, buprenorphine and long-acting morphine. We also included patients who were treated with heroin in the heroin maintenance

treatment (HMT) program during the same period. Primary care specialists and internists provided comprehensive medical services throughout the study. The fulltime staff in our outpatient clinics included nurses and social workers. According to stability and physical and mental wellbeing, the patients were seen by our clinic staff at different intervals from daily to at least once a week. With the exception of prescribed heroin, which has to be consumed daily at the clinic, patients were allowed to get up to 6 take-home doses of the substitution medication per week. If required, our patients had access to a walk-in clinic at all times with medical and psychiatric staff at their disposal. Internists and primary care specialists were responsible for HCV treatment. If necessary, they consulted with off-site hepatologists to discuss patient care issues. Specially trained nurses were involved in every consultation providing medical and psychosocial support, side effect management and information about the disease and treatment.

All patients signed an informed consent form about using their anonymised data for this study.

Treatment protocol

All patients in OMT programs with chronic hepatitis C (twice positive for HCV antibodies and HCV RNA) were informed about the possibility of HCV treatment at our clinics. HCV treatment was offered to all interested patients who did not show any contraindications such as uncontrolled substance abuse, uncontrolled depression, psychosis or a severe concurrent medical disease. Importantly, reported illicit drug use (heroin, cocaine, cannabinoids or non-prescribed benzodiazepine) and/or intake of alcohol, injecting drug use or psychiatric co-morbidities were no contraindication per se for the start of HCV treatment in our study. Patients who consumed substances were offered treatment as long as their consumption happened in a controlled manner. Our definition of controlled substance use means consuming according to rules for safer

use and in modest amounts so as not to impair adherence to treatment. We also included patients with HIV co-infections as well as patients on prescribed heroin.

Before starting HCV treatment, the patients underwent the following examinations: clinical examination by a psychiatrist, standard medical examination by an internist or primary care specialist, an assessment of liver disease and a baseline blood test. HCV genotype and HCV RNA (IU ml -1) were quantified at baseline and an abdominal ultrasound was performed. A liver biopsy was not a prerequisite for treatment.

The HCV treatment and monitoring was carried out according to EASL guidelines with once weekly pegylated interferon α-2a (180ug/week) or α-2b (1.5ug/kg/week) plus weight-based ribavarin orally twice daily. The patients could inject the interferon at home or receive the injections at the clinic (either self-administered or given by a nurse). Ribavarin was dispensed in daily doses and take-homes were given up to a month's supply, depending on the individual situation of each patient.

In the first four weeks of HCV treatment, all patients attended the clinic at least once a week to be assessed for haematological and liver parameters and clinical side effects. After the initial four weeks, they were offered to attend the clinic once weekly or more if needed. They could make an appointment or just drop in to see the internist, the nurse or the psychiatrist. In week 12, 24 and 48, and again 24 weeks after the end of treatment, consultations were mandatory to evaluate the treatment.

Outcome measures and assessments

The primary outcome of our study was sustained virological response (SVR) defined as undetectable HCV RNA (<30 IU ml-1) in serum six month after the end of treatment. A secondary outcome was to determine patient characteristics associated with treatment success.

The psychiatric co-morbidities including the substance dependences were diagnosed by the psychiatrists and referred to the 'International Statistical Classification of

Diseases and Related Health Problems' (ICD 10). Data on socio-economic characteristics and quality of life was collected by means of a questionnaire. The data collection on socio-economic characteristics included questions about the patient's current housing situation, i.e. whether they were living by themselves or with a partner, whether they were having permanent accommodation or not and where they got their income from (employment, disability benefits or social welfare). The quality of life was assessed by a self-administrated questionnaire asking about the current mental, physical and socio-economic condition (good, moderate, poor). The patients were also asked to declare their use of illicit drugs and intake of alcohol. If they used illicit substances at least once during the HCV treatment, they were counted as positive for illicit drug use. In the same way they counted as patients who use injecting drugs (PWUJD) during the HCV treatment if they injected substances at least once. The intake of alcohol was also asked by self-report (intake on regular basis = more than 50g/week). The use of illicit substances and alcohol was asked before starting and during HCV treatment. We counted the number of consultations in the clinic to assess how much supportive care they needed.

Statistical analyses

Descriptive statistics were calculated for all variables and presented as median (interquartile range) or frequency as appropriate. Patients were categorized into two groups according to their HCV treatment success (i.e. SVR and non-SVR). Non-parametric group comparisons were performed to test for differences in the distribution of patient characteristics. Multiple logistic regression analysis was applied to further investigate the independent association between treatment success and patient characteristics. The final model included significant patient characteristics (e.g. p-value <0.05) resulting from the bivariate analysis. To minimise confounding socio-demographics as well as addiction and infection specific characteristics were included

into the model, irrespective of the significance level. Goodness of fit of the final model was tested by applying the Hosmer-Lemeshow test. A two-sided p-value of <0.05 was considered statistically significant. All statistical analysis was performed using STATA for Windows (version 12.1; Stata Corp., College Station, Texas).

RESULTS

Population

Between 2002 and 2010, we initiated HCV treatment in 66 opioid-dependent patients (80% male) with a median (IQR) age of 40 (33.7-44.2) years at the beginning of treatment. 50% (n=33) of patients had genotype 3, 32% (n=21) genotype 1, 14% (n=9) genotype 4 and 4% (n=3) genotype 2. Baseline viral load was below 800'000IU/ml in 41% (n=27).

The median duration of opioid maintenance treatment (OMT) before HCV treatment was 24.5 months (IQR 8.6-77.2). 36% (n=24) of all patients had one, 32% (n=21) had two or more additional substance abuse diagnoses (e.g. cocaine, benzodiazepine, cannabinoid or alcohol dependence). During HCV treatment, 70% (n=45) of patients received opioid substitution treatment (OMT) with methadone, buprenorphine or morphine, 21% (n=14) were treated with heroin and 9% (n=7) were not substituted at all. 69% of all patients declared an active or former injection drug use**.** 40% of all patients reported injecting drug use during HCV treatment. A majority of patients (77%) used illicit drugs, including injecting and non-injecting drugs, during HCV treatment. 21 patients (32%) reported alcohol intake on a regular basis.

In the study population, psychiatric co-morbidities were diagnosed in 83% (n=54), HIV co-infection in 11% (n=7). The socio-economic characteristics of the patients before initiation of HCV treatment are shown in table 1.

HCV treatment outcome

41 out of 66 patients (62%) achieved SVR. In 5 patients without follow-up a negative HCV-RNA has been documented at the end of treatment. Therefore, among patients with available follow-up information required to assess SVR, an SVR of 67% (41 of 61) was reached.

85% (28 of 33) of patients with genotype 3 achieved SVR, 33% (7 of 21) with genotype 1, 67% (2 of 3) with genotype 2, and 44% (4 of 9) with genotype 4. In bivariate analysis, there was a significant difference in SVR across genotypes ($p<0.001$), which was mainly related to the SVR in genotype 3 (84%, 28 of 33) in comparison to the 'non-3' genotypes with a composite SVR of 39.4% (13 of 33).

Nine out of the 14 patients with heroin treatment had genotype 3, two had genotype 4 and three had genotype 1. 64% (n=9) of the patients treated with heroin achieved SVR (8 with genotype 3, 1 with genotype 4).

In the group of HIV co-infected patients (n=7), three had genotype 3, three genotype 1 and one had genotype 2. Out of the seven HIV co-infected patients, 43% (n=3) achieved SVR.

Number of consultations, duration of treatment and reasons for treatment failure

During their treatment, 49% (n=30) of patients were seen at our clinic at least once a week, 40% (n=25) had a consultation at least every two weeks and only 11% (n=7) had less than one consultations every two weeks (missing of data in 4 cases).

45 patients received HCV treatment as intended in the protocol. 21 patients had to terminate HCV treatment at an early stage, 15 of them due to medical reasons. 9 drop outs had a viral failure (2 with breakthrough, 7 non-responders). In 5 cases we had to stop the treatment at an early stage because of severe medical conditions (2 due to anaemia, 1 due to leucopoenia, 1 due to severe loss of weight and diarrhea and 1 due to Bartter-Schwarz syndrome). Nevertheless, these 5 patients achieved SVR.

Reasons for drop-out, treatment failure and outcome are shown in detail in figure 1.

Patient factors for treatment success

Detailed bivariate comparisons of patient characteristics according to SVR status are listed in table 2. In addition to HCV genotype, a longer duration of OMT, more consultations per week and self-reported poor physical condition were associated with non-SVR. Illicit drug use, including injecting and non-injecting drugs, during HCV treatment was not associated with SVR.

Longer OMT duration and non-genotype 3 remained independently associated with non-SVR in a multiple logistic regression model controlling for the following covariates: age, sex, number of consultations per week, self-reported physical health, heroin treatment, injecting drug use and illicit drug consumption and alcohol consumption during HCV treatment, HIV-co-infection and number of additional substance abuse disorders. Corresponding adjusted odds ratios for OMT duration (per month) and non-genotype 3 for treatment failure were 1.04 (p=0.016), and 39.4 (p=0.010). A goodness of fit test of the final model did not reveal a violation of the regression assumptions.

There was a significant and inverse association between self-reported physical health categories (good, moderate, poor) and weekly number of consultations. Corresponding median (IQR) weekly consultations for good, moderate and poor self-reported physical health were as follows: 0.8 (0.7-1.4); 1.0 (0.6-1.3) and 1.5 (1.1-2.2) (p=0.022 and p=0.026 for the comparison between poor vs. moderate and poor vs. good physical health respectively).

DISSCUSION

In our study, we have demonstrated feasibility of providing HCV treatment successfully within an integrated primary care based setting to a multi-morbid population of people

who use drugs. 62% of the patients achieved SVR. The patients with HCV genotype 3, the most common genotype within the population of PWUD in Europe, achieved an SVR rate of 84%. A high percentage (over 80%) of the patients was diagnosed with a psychiatric co-morbidity and 10% were co-infected with HIV. Despite OMT, 70% of patients used illicit drugs (34% even injecting drug use) during HCV treatment. In the group of patients with prescribed heroin, the SVR rate of 64% was comparable to the overall SVR rate. So HCV treatment is also feasible in heroin maintenance treatment.

Comparisons of patient characteristics according to SVR or non-SVR showed some significant factors for not reaching SVR (non-SVR). Not surprisingly, the genotype 'non GT 3' was one of the factors. A longer duration of OMT, more consultations per week during HCV treatment and poor self-reported physical condition were also associated with non-SVR. In multivariable logistic regression analysis, only 'non-GT-3' and a longer duration of OMT remained significantly associated with HCV treatment failure. We assume that a longer duration of OMT is an indicator of poorer psychosocial and physical condition and reduced stability. This instability could influence HCV treatment, e.g. by reducing tolerability of side effects leading to reduction of dosage of antiviral therapy or by reducing adherence to the treatment. Notably, the on-going illicit use of drugs, even injecting drug use, was not a factor for not reaching SVR.

As we offered support according to individual needs, our patients claimed more supportive care und counselling than is recommended in treatment schedules for patients without drug use (12). Almost half of the patients required, on average, one consultation per week during the whole HCV treatment. Around 40% of the patients needed a consultation every two weeks. On the one hand, the intensive integrated care is probably one of the reasons for the treatment success in this hard-to-reach population. On the other hand, the observed correlation between self-reported physical health and number of consultations, both associated with treatment failure, also suggests a non-linear association between the demand of care and non-SVR.

A main strength of our study is the inclusion of patients regardless of on-going illicit drug use, intake of alcohol and psychiatric co-morbidities. This population represents in a realistic way the difficult-to-treat population of multimorbid PWUD. A further strength is the inclusion of patients in heroin maintenance treatment programs, as this could be a possible setting to reach those patients and provide them with HCV treatment. We are aware of several limitations of our study. The retrospective analysis and the absent control group are the major limitations. Another limitation is the self-reported drug use. However, because the use of drug had no consequences for the patients, such as exclusion from HCV treatment or substitution therapy, we assume high validity of the data (13, 14).

Our results correspond with other studies demonstrating the feasibility of HCV treatment of PWUD with comparable SVR rates to patients without drug use in different settings (7-10, 15-22). As we did in our study, they describe that OMT with a multidisciplinary approach is a safe and successful opportunity to treat PWUD for HCV (18, 23-27). However, in some of these studies, patients with active drug use and/or alcohol intake and/or HIV infection were excluded or not described in detail. Therefore, our study population indicates to a greater extent the multimorbid difficult-to-treat population of PWUD including patients in heroin treatment programs. As far as we know, there is only one published study about HCV treatment in heroin treatment programs with a population of 21 patients (28) with SVR rates comparable to our small sample.

A main feature of our HCV treatment setting is the provision of health care services in an integrated primary care based (all under one roof) setting. Primary care based settings for HCV treatment for either patients without drug use or PWUD have rarely been described (29-31). Hence we present a relatively unique possible setting for HCV

management in PWUD. To integrate HCV treatment in OMT with primary care facilities seems to be a promising approach because if patients are referred to a specialized off-site clinic for HCV treatment, less than a third will attend (32). An advantage of integrating HCV treatment in primary care is its low threshold service, which facilitates treatment uptake. Offering easily accessible HCV treatment means reaching more patients of the marginalised population of PWUD. Thus the primary care setting is in all likelihood the most suitable setting to increase HCV treatment uptake in this hard-to-reach population.

There is increasing evidence that patients with chronic diseases such as heart failure and diabetes benefit from integrated care models (33-35). A strong primary care based approach can improve quality of care by coordinated and integrated care in chronically ill patients. If we consider HCV infection as a chronic condition, an integrated primary care based treatment would be the appropriate approach. A recent randomized controlled trial of an integrated care intervention (36) demonstrated a significantly higher HCV treatment eligibility compared to the standard care group, suggesting a treatment expansion to underserved populations. These findings support our hypothesis that PWUD would benefit from such an approach.

We want to point out in particular the individualised and need-adapted approach we offered in our integrated setting. We offered as many consultations during the HCV treatment for supportive care as needed instead of predetermined appointments. As far as we know, this is the first study to take into account the individualised support. In previous studies the frequency of consultations was described as ‘weekly’, ‘several times per week’ or ‘as needed’ (18, 23, 25, 31, 37) but so far has not been integrated in the analyses.

The need-adapted approach in our setting implies more effort with more supportive care for the patients. Consultations on a need-based frequency during HCV treatment

could improve the understanding of the treatment and therefore the handling of side effects for both the patient and the physician involved. This personalised support could help the patient complete the treatment. Maybe the major advantage of our clinic is the emphasis on the low threshold to treatment and staff-patient relationships, as patients are well known by the staff. According to our findings with regard to the extensive support we gave to the patients, only few stopped treatment early on due to personal reasons. There are only a few prospective studies with randomized control groups reviewing the effects of different support strategies on hepatitis C treatment outcomes in PWUD (38).

Another aspect of our study we would like to point out is the potential impact of HCV treatment in the population of PWUD on public health. Mathematical modelling predicts that scaling up treatment uptake could have a positive impact on HCV prevalence and therefore reducing the risk of infection (39, 40). As long as treatment rates especially in the hard to reach population of PWUD remain low, the future highly effective and well tolerated antiviral agents will have limited global impact. So treatment settings that enhance treatment uptake might have the potential to affect public health by reducing HCV prevalence. Increasing the availability of treatment settings as described in our study could help scale up treatment uptake in PWUD.

The question which the most efficient and cost-effective HCV treatment setting for a multi-morbid collective of PWUD is remains unanswered. Another question that has not been answered is whether our approach is as cost-effective as HCV treatment for PWUD is in general (41).

We conclude that offering HCV treatment in an integrated primary care based setting with OMT and individualised use of different supporting strategies allows for treatment success rates in the multi-morbid population of PWUD which is comparable to the ones

in the population of patients without drug use. Furthermore, heroin maintenance treatment programs offer a feasible and safe setting for providing HCV treatment.

Using integrated primary care based multidisciplinary management strategies for chronic care seems to be a promising way to optimise treatment uptake and the treatment itself in the underserved population of PWUD. To enhance treatment uptake rates, more integrated primary care based settings should be set up. Therefore, addiction treatment programs with OMT should provide on-site HCV treatment for their patients.

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TABLES AND FIGURES

Table 1: Socio-economic characteristics of the study population (n=66) before initiation of HCV treatment

Characteristic	**n (%)**
Living with partner	23 (37.7%)
Permanent accommodation	57 (93.4%)
Income	
Employment (full-time or part-time)	15 (25.0%)
Disability benefits	20 (33.3%)
Social welfare	25 (41.7%)
Mental condition*	
Good	18 (40.0%)
Moderate	24 (53.3%)
poor	3 (6.7%)
Physical condition*	
Good	21 (46.7%)
Moderate	17 (37.8%)
poor	7 (15.6%)
Socioeconomic condition*	
Good	18 (41.9%)
Moderate	21 (48.8%)
Poor	4 (9.3%)

Due to missing's 100% does not correspond to the total number of patients (n=66)
*self-assessment

Table 2. Numbers of consultations during HCV treatment

Consultations	**Median (IQR)/n (%)**
Total number of consultations during treatment (N))	26.5 (18.8-39)
Number of consultations per week during treatment	1 (0.6-1.3)
At least one consultation/week of treatment (%)	30 (48.4%)
At least one consultation/two weeks of treatment (%)	25 (40.3%)
Less than 2 consultations/two weeks of treatment (%)	7 (11.3%)

Due to missings (n=4), 100% does not correspond to the total number of patients (n=66))

Table 3: bivariate comparison between the SVR and 'non-SVR' group

	SVR (n=41)	Non-SVR (n=25)	p-value for comparison between groups
Male	32 (78.0)	21 (84.0)	
Female	9 (22.0)	4 (16.0)	0.5
Age at start of treatment	38.5 (32.4-43.4)	41.5 (36.8-47.1)	0.089
Maintenance medication:			
Methadone, buprenorphine or morphine	29 (70.7)	17 (68)	
Heroin	9 (22.0)	5 (20)	
None	3 (7.3)	3 (12)	0.8
Heroin treatment			
yes	9 (22.0)	5 (20.0)	
no	32 (78.0)	20 (80.0)	0.5
OMT duration (months)	17 (7-38)	72 (13-120)	0.018
IDU ever			
yes	29 (70.7)	15 (65.2)	
no	12 (29.3)	8 (34.8)	0.6
Comorbidities IDC 10; F1			
opiate diagnosis only	14 (34.2)	7 (28.0)	
one additional diagnosis of substance abuse	14 (34.2)	10 (40.0)	
two or more additional diagnoses of substance abuse	13 (31.6)	8 (32.0)	0.8
Mental comorbidity (other than ICD 10: F1)	31 (75.6)	23 (92.0)	
yes	10 (24.4.9)	2 (8.)	0.2
no			
HIV co-infection			
yes	3 (7.3)	4 (16.0)	
no	38 (92.7)	21 (84.0)	0.4
Living with partner			
yes	13 (35.1)	10 (41.7)	
no	24 (64.9)	14 (58.3)	0.6
Permanent accommodation			
yes	36 (97.3)	21 (87.5)	
no	1 (2.7)	3 (12.05)	0.3
Income			
employment (full-time or part-time)	10 (27.0)	5 (21.7)	
disability benefits	10 (27.0	10 (43.5)	
social welfare	17 (46.0)	8 (34.8)	0.4
Mental condition*			
good	12 (42.9)	6 (33.3)	
moderate	15 (53.5)	9 (50.0)	
poor	1 (3.6)	3 (16.7)	0.7
Physical condition*			
good	12 (42.9)	9 (52.9)	
moderate	14 (50.0)	3 (17.7)	
poor	2 (7.1)	5 (29.4)	0.038
Socio-economic condition*			
good	11 (40.7)	7 (43.7)	
moderate	13 (48.2)	8 (50.0)	
poor	3 (11.1)	1 (6.3)	1.0
Median number of weekly encounters (IQR)	0.8 (0.5-1.2)	1.2 (0.8-1.5)	0.024

Due to missing's 100% does not correspond to the total number of patients (n=66) *self-assessment

FIGURE 1: SVR rates per genotyp

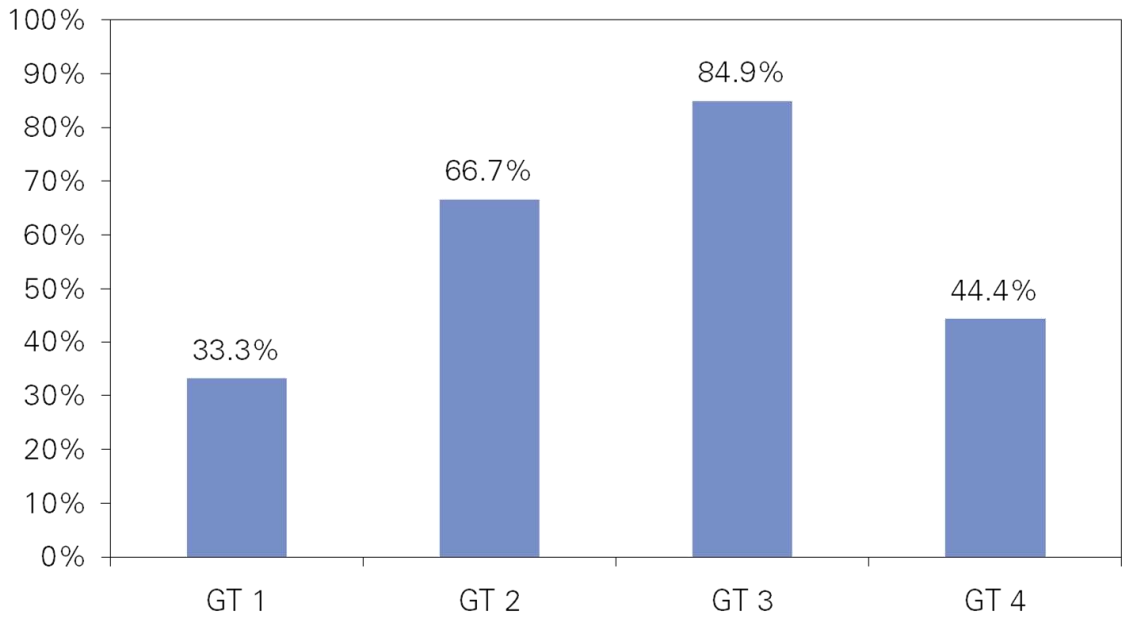
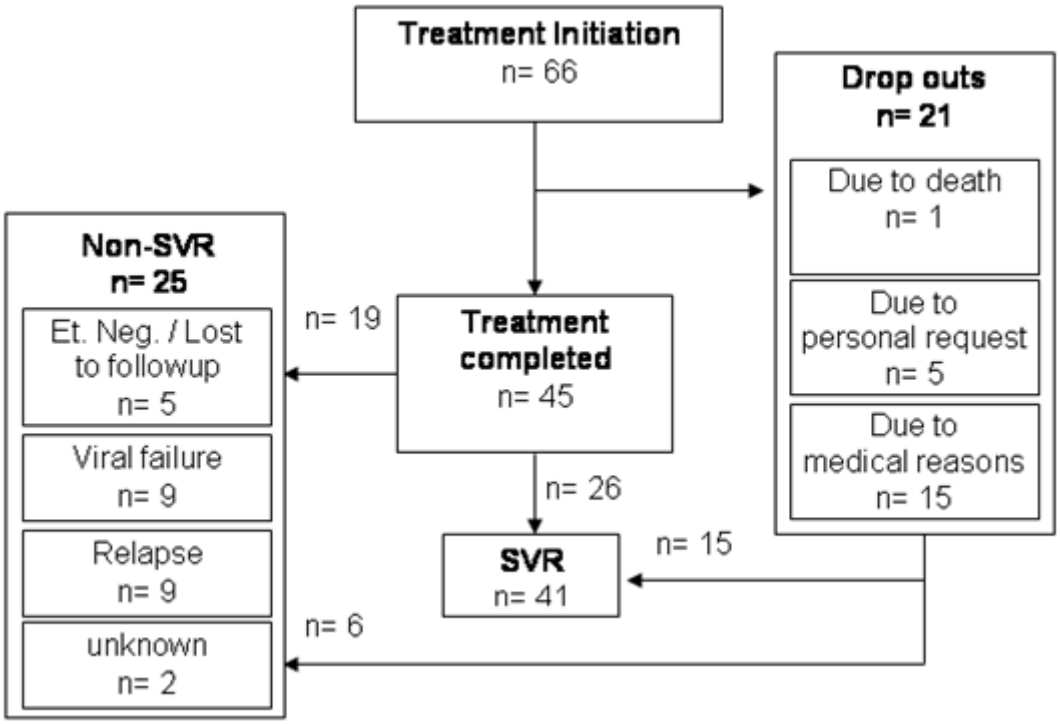


FIGURE 2: Reasons for drop-out and treatment failure



Et.Neg = End of treatment HCV-RNA negative, Lost of follow up